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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,383	01/05/2001	Bruce M. Schena	IMM029B	6408

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Phil Albert Esq
Townsend and Townsend
Two Embarcadero Center 8th Floor
San Francisco, CA 94111

EXAMINER	
LEWIS, DAVID LEE	

ART UNIT	PAPER NUMBER
2673	23

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/755,383	SCHENA ET AL.	
	Examiner	Art Unit	
	David L Lewis	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *47-68 and 71-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *47-68 and 71-80* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 47-50, 52, 54, 56-60, 71-73, 75, and 77-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannaford et al. (5642469) in view of Noll (3919691).**

2. **As in claims 47 and 71, Hannaford et al. teaches** of a touchpad sensor configured to detect a position and motion of an object in an x-y plane, **column 1 lines 15-25, column 4 lines 1-5 and 49-55**, said touchpad sensor further configured to detect a degree of force applied to said touchpad sensor in a z-direction, **column 4 lines 1-5 and 9-24**, and to output at least one sensor signal, the sensor signal being based on the position of the object, the motion of the object and the detected degree of force, **column 1 lines 52- 67, column 2 lines 5-12. and 20-23**; and at least one actuator, **column 4 lines 49-55**, coupled to and spaced apart from said touchpad sensor, **column 4 lines 52-55**, said actuator configured to receive a feedback signal from the computer and generate haptic feedback based on the feedback signal, the feedback signal being

associated with the sensor signal, **column 1 lines 32-34, 53-67, column 2 lines 20-23, column 3 lines 5-10, and a linkage coupling the object and the touchpad sensor, column 1 lines 16-31, figures 2-4, wherein said linkage can be any of said pen based manipulator, actuators, joints, and links, known in the art. The pen like tool 14 is used to apply forces and links the object to the touchpad as claimed.** Wherein the force feedback device in conjunction with the force feedback display serves as a force-reflective, haptic, kinesthetic, or tactile interface between an operator and a simulated environment. A manipulator having three degrees of freedom responds to the applied forces depending on the position of the control point and force applied, with a sensation felt by the operator. The manipulator controls the control point which is coupled to actuators that are connected to encoders and sensors obviously for the purpose producing electric signals related to the position and displacement of the control point, given encoders and sensors are know to produce signals. **Therefore while Hannaford et al. does not** explicitly express the teaching of output signals they would have been obvious to the skilled artisan given said senor and encoders are connected with said actuator. Based on the computer controlled algorithm in a simulated environment, force sensations are reflected back to the control point to be experienced by the operator, depending on the control points location and displacement within the simulated environment. The manipulator includes a planar structure enabling motion in an xy plane to define two degrees of freedom. The planar structure is moved along a z axis by actuators to define a third degree of freedom. The electric signals are produced by the encoders, column 4 lines 45-60, and sensors, column 3 lines 5-10, said

sensors being tied to the actuators for position sensing. As shown in figures 4 and 5, the at least one actuator 32, is coupled to and spaced apart from the touchpad sensor point 12, given the teaching of redundant actuators but not redundant encoders exist. Whereby a redundant actuator without an encoder is spaced apart from a first actuator including sensing elements. **Noll teaches of** the a tactile feedback force display system as taught by Hannaford et al., wherein the missing system and signal level schematic of Hannaford is shown by Noll's figure 1. The features of Noll are combinable and with Hannaford's given Noll also teaches that for such a tactile feedback display system any arrangement for permitting controlled motion in the three directions may be used, column 3 lines 45-50. **Noll further teaches** of the combination of potentiometers, accelerators, and strain gages for the purpose of measuring force applied to the system, column 5 lines 9-29. Such a combination can be implemented as a substitute in Hannaford in connection with said sensing elements coupled to the actuator. **Therefore it would have been obvious** to the skilled artisan at the time of the invention to combine the sensing elements of Noll with the actuator elements of Hannaford because Noll teaches that tactile feedback force display systems can use any arrangement for permitting controlled motion in the three directions, as found in claims 47 and 71.

3. **As in claim 60, Hannaford et al. in view of Noll teaches** of the limitations as applied to claims 47 and 71 as amended, **and a linkage coupling the object and the**

touchpad sensor, column 1 lines 16-31, figures 2-4, wherein said linkage can be any of said pen based manipulator, actuators, joints, and links, known in the art, the pen like tool 14 is used to apply forces and links the object to the touchpad as claimed, further Hannaford teaches of an object movable in an xy plane, the object being associated with a graphical representation of a cursor, column 1 lines 16-17, 52-67, column 2 lines 7-29, wherein a graphical cursor is broadly interpreted as a computer displayed icon that moves on the display based on the manipulation of an input device, wherein the force display of Hannaford inherently teaches of a computer object being moved according to a manipulated input device, wherein depending on the position of the control point and force applied to a manipulator within a virtual reality computer simulated environment shown the user via the display interface, the operator moves an iconic scalpel to perform surgery and feel the tactile feedback when cutting simulated tissue. The iconic scalpel in this embodiment is the graphical cursor being moved in the xy plane, as found in claim 60. **Further, Noll teaches** also teaches of seeing the position of a point in space on a display as he moves the control stick under the control of the computer, column 4 lines 18-39, wherein a said point represents a cursor as is known in the art, as found in claim 60.

4. **As in claims 77-80**, Hannaford teaches of wherein the linkage includes a pointer member, figure 2 item 14, and wherein the linkage is further coupled to the actuator, figure 1 items 38, 40, 42, 43, 42, 12.

5. **As in claim 48 and 72**, Hannaford teaches wherein the magnitude of haptic feedback is proportional to the detected degree of force, column 2 lines 10-25, wherein

the operator is able to trace the virtual object shapes and feel the object boundaries, such as tissue having a shape, texture and force resistance variables at different locations. Therefore the operator experiences the sensation of cutting through the virtual tissue in proportion to the texture given to the tissue and the force applied to the control point, obviating the magnitude of haptic feedback being proportional to the detected degree of force, given these simulation objectives. Noll also teaches of wherein the magnitude of feedback force is proportional to the measured force, column 5 lines 20-30. **As in claim 49 and 73**, Hannaford teaches wherein the haptic feedback is configured to simulate friction in the xy plane, column 2 lines 10-25, wherein said force resistance variables at different locations produces haptic feedback in the xy plane. Further Noll teaches of said feedback simulating friction in the xy plane, column 4 lines 40-60. **As in claim 50**, Hannaford teaches wherein the haptic feedback is based on data values associated with a graphical representation of a pen drawing object on a graphical display, column 1 lines 59-67, column 2 lines 10-30, column 3 lines 11-15, wherein said limitation would be an obvious design choice given the known uses of pen-based input device manipulators. **As in claim 52**, Hannaford teaches wherein the haptic feedback is a texture sensation, column 2 lines 16-18. Noll, column 6 lines 55-65, column 7 lines 25-35. **As in claim 54 and 75**, Hannaford teaches wherein the actuator is configured to generate the haptic feedback if the detected degree of force exceeds a predetermined level, column 2 lines 10-30, wherein the level between zero force and force applied produces a haptic feedback response. Noll, column 7 lines 5-40. **As in claim 56**, Hannaford teaches wherein said touchpad sensor is configured to

detect a contact location of a pointer member, the pointer member being associated with the object, column 3 lines 5-10. **As in claim 57**, Hannaford teaches further comprising a linkage mechanism configured to couple the object to said actuator, said linkage mechanism configured to allow motion of the object in said x-y plane, column 3 lines 11-16, column 2 lines 38-48, figures 4 and 5, **figure 1 items 38, 40, 42, 43, 42, 12**. **As in claim 58**, Hannaford teaches wherein said user manipulatable object is one of a mouse and a stylus, column 3 lines 10-16, further wherein it would have been obvious to the skilled artisan that a mouse is a well known substitute input device for said pen-like tool or stylus. **As in claim 59**, Hannaford teaches of wherein said touchpad sensor includes a planar photo diode, column 4 lines 42-67, wherein photo diodes are well known encoder means for input devices with three degrees of freedom.

6. Claims 51, 53, 55, 61-68, 74, and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannaford et al. (5642469) in view of Noll (3919691) and Zilles et al. (6111577).

7. **As in claims 51, 53, 55, 61-68, 74, and 76 Hannaford et al. teaches** of said invention as applied to claims 47, 60, and 71, however Hannaford is silent as to said computer and processor details, said damping, said function of velocity, texture, and indexing. **Zilles et al teaches** of a tactile force feedback manipulator devices with three degrees of freedom as describe by Hannaford, however Zilles et al in not silent on said computer and processor details and other features, **figure 15, column 18 lines 43-55**,

wherein the computer and processor details of Hannaford are well known as suggested by Zilles. **Nor is Noll silent on said silent as to said features, figure 1 and columns 5 and 7. As in claim 61**, Zilles teaches of further comprising a control processor separate from said host computer, said control processor controlling said at least one actuator to output said tactile sensations, and wherein data derived from said degree of force or pressure applied to said touchpad sensor is used by said control processor, at least in party, to control said tactile sensations, column 18 lines 43-55. Noll, figure 1 item 10. **As in claim 62-67**, Zilles teaches of said damping, friction, and texture sensations, column 7 lines 7-17, column 17 lines 1-13. Noll, column 5-7. **As in claims 51, 53, and 74**, Zilles teaches of said control as a function of velocity, column 7 lines 5-25. Noll, column 5 lines 5-15. **As in claims 68**, Hannaford in view of Zilles teaches of said stylus and mouse for the same reasons of obviousness as applied to claim 58, in view of said three degrees of freedom. **As in claims 55 and 76,** said indexing based on force in the z direction is well known in the art of input devices with three degrees of freedom as taught by both Hannaford and Zilles. Noll teaches of force in three degrees of freedom, column 5 lines 15-30, and indexing, column 8 lines 47-60.

Response to Arguments

8. Applicant's arguments filed on 2/18/2004 with respect to claims 47-68 and 71-80 have been considered but are not persuasive. See the new rejection over Hannaford, Noll, and Zilles. Hannaford teaches of said added claims limitation, a linkage coupling

the object and the touchpad sensor, column 1 lines 16-31, figures 2-4, wherein said linkage can be any of said pen based manipulator, actuators, joints, and links, known in the art, each serving a linkage function within the shown device. The pen like tool 14 is used to apply forces and links the object to the touchpad as claimed. The Examiner acknowledges that there was no substitute specification submitted, and therefore the previous rejection of it was improper, and is withdrawn.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L Lewis whose telephone number is 703 306-3026. The examiner can normally be reached on M, T, TH, F. If attempts to reach the

examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703 305-4938. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231
or faxed to:
(703) 872-9314 (for Technology Center 2600 only)
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

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BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600